Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1-10. (Cancelled)

11. (Currently Amended) A controller for a flowmeter comprising:

an input module operable to receive a sensor signal from a sensor connected to a vibratable flowtube, the sensor signal related to a fluid flow through the flowtube;

a signal processing system operable to receive the sensor signal, determine sensor signal characteristics, and output drive signal characteristics for a drive signal applied to the flowtube;

an output module operable to output the drive signal to the flowtube; and

a control system operable to modify the drive signal and thereby maintain oscillation of the flowtube **[[when]]** during a time in which an apparent density of the fluid flow, as determined by the signal processing system based on the sensor signal characteristics, drops by more than ten percent in response to an introduction of gas within the fluid flow.

12. (Previously Presented) The controller of claim 11 wherein the control system is operable to maintain oscillation of the flowtube **[[when]]** during a time in which the apparent density drops by more than fifteen percent in response to the introduction of gas within the fluid flow.

13. (Previously Presented) The controller of claim 11 wherein the control system is operable to maintain oscillation of the flowtube **[[when]]** during a time in which the apparent density drops by more than twenty percent in response to the introduction of gas within the fluid flow.

14. (Previously Presented) The controller of claim 11 wherein the control system is operable to modify the drive signal by increasing a drive gain applied to the drive signal in response to a reduction of the apparent density.

15. (Cancelled)

16. (Previously Presented) The controller of claim 14 wherein the drive gain is defined as a ratio of a driver current of the drive signal to an amplitude of oscillation of the flowtube.

17. (Previously Presented) The controller of claim 14 wherein the drive gain is defined as a ratio of a driver current of the drive signal to a sensor voltage of the sensor signal.

18. (Previously Presented) A method for operating a flowmeter comprising:

receiving a sensor signal from a sensor connected to a vibratable flowtube, the sensor signal related to a fluid flow through the flowtube;

processing the sensor signal to determine sensor signal characteristics,

determining, based on the sensor signal characteristics, drive signal characteristics for a drive signal applied to the flowtube, the drive signal characteristics including a drive gain;

determining, based on the sensor signal characteristics, a flow transition characterized by the drive gain rising in conjunction with a reduction in an apparent density of the fluid flow; and

transitioning the flowmeter from a first state in which a substantially non-aerated fluid flow exists in the flowtube to a second state in which an aerated fluid flow exists in the flowtube, based on the flow transition.

19. (Previously Presented) The method of claim 18 wherein determining drive signal characteristics comprises determining a first-state drive gain associated with the first state.

20. (Previously Presented) The method of claim 19 comprising maintaining oscillation of the flowtube when a second-state drive gain used for driving the flowtube in the second state is more than ten times the first-state drive gain.

21. (Previously Presented) The method of claim 20 wherein the second-state drive gain is more than twenty times the first-state drive gain.

22. (Currently Amended) The method of claim 18 wherein the determining the flow transition occurs during a ~~comprises determining the~~ reduction in apparent density ~~to be~~ of greater than [[one]] ten percent.

23. (Currently Amended) The controller of claim [[16]]18 wherein the drive gain is defined as a ratio of a drive current of the drive signal to an amplitude of oscillation of the flowtube.

24. (Currently Amended) The controller of claim [[16]]18 wherein the drive gain is defined as a ratio of a drive current of the drive signal to a sensor voltage of the sensor signal.

25. (Currently Amended) A flowmeter comprising:

a vibratable conduit conducting a fluid flow;

a driver connected to the conduit and operable to impart a motion to the conduit;

a sensor connected to the conduit and operable to sense the motion of the conduit; and

a control and measurement system connected to the driver and the sensor, the control and measurement system comprising circuitry to:

receive a first sensor signal from the sensor during a non-aerated fluid flow through the conduit ~~at approximately half of a maximum flowrate of the flowmeter.;~~

generate, based on the first sensor signal and using digital signal processing, a first drive signal having a drive frequency, the first drive signal having a drive gain based on the first sensor signal;

receive a second sensor signal from the sensor upon introduction of gas to the fluid flow, the gas comprising [[less]] more than five percent by volume of a total fluid flow;

generate a second drive signal based on the second sensor signal and using digital signal processing; and

update the drive gain in response to the introduction of the gas at a drive gain update rate, wherein the drive gain update rate is at least five percent of the drive frequency.

26. (Previously Presented) The flowmeter of claim 25 wherein the control and measurement system is operable to update the drive gain incrementally, each increment occurring at the drive gain update rate.

27. (Previously Presented) The flowmeter of claim 25 wherein the drive gain update rate is at least ten percent of the drive frequency.

28. (Previously Presented) The flowmeter of claim 25 wherein the drive gain update rate is at least twenty percent of the drive frequency.

29. (Previously Presented) The flowmeter of claim 25 wherein the drive gain update rate is at least fifty percent of the drive frequency.

30. (Previously Presented) The flowmeter of claim 25 wherein the drive gain update rate is at least equal to the drive frequency.

31. (Previously Presented) The flowmeter of claim 25 further comprising:

an analog-to-digital converter operable to convert the sensor signal received from the sensor from analog form to digital form; and

a digital-to-analog converter operable to convert the drive signal from digital form to analog form, for application to the conduit via the driver.

32. (Previously Presented) A controller for a flowmeter comprising:

an input module operable to receive a sensor signal from a sensor connected to a vibratable flowtube, the sensor signal related to a fluid flow through the flowtube;

a signal processing system operable to receive the sensor signal, determine sensor signal characteristics using digital signal processing, and output drive signal characteristics for a drive signal applied to the flowtube, the drive signal characteristics including a drive gain to be applied to the drive signal;

a control system operable to modify the drive signal and thereby maintain oscillation of the flowtube at a determined oscillation frequency, wherein the drive gain is modified in response to a change in condition of the fluid flow, as necessary to maintain the oscillation of the flowtube, such that the drive gain incrementally changes at least once per forty cycles of the oscillation frequency; and

an output module operable to output the drive signal to the flowtube.

33. (Previously Presented) The controller of claim 32 wherein the oscillation frequency corresponds to a natural frequency of vibration of the flowtube.

34. (Previously Presented) The controller of claim 32 wherein the drive gain is modified in response to a change in condition of the fluid flow, as necessary to maintain the oscillation of the flowtube, such that the drive gain incrementally changes at least once per twenty cycles of the oscillation frequency.

35. (Previously Presented) The controller of claim 32 wherein the drive gain is modified in response to a change in condition of the fluid flow, as necessary to maintain the oscillation of the flowtube, such that the drive gain incrementally changes at least once per ten cycles of the oscillation frequency.

36. (Previously Presented) The controller of claim 32 wherein the drive gain is modified in response to a change in condition of the fluid flow, as necessary to maintain the oscillation of the flowtube, such that the drive gain incrementally changes at least once per five cycles of the oscillation frequency.

37. (Previously Presented) The controller of claim 32 wherein the drive gain is modified in response to a change in condition of the fluid flow, as necessary to maintain the oscillation of the flowtube, such that the drive gain incrementally changes at least once per cycle of the oscillation frequency.

38. (Previously Presented) A flowmeter comprising:

a vibratable conduit;

a driver connected to the conduit and operable to impart a motion to the conduit;

a sensor connected to the conduit and operable to sense the motion of the conduit; and

a control and measurement system connected to the driver and the sensor, the control and measurement system comprising circuitry to:

receive a first sensor signal from the sensor at a first mass flow rate of fluid through the conduit;

generate, based on the first sensor signal, a measurement output characterizing a property of the fluid;

receive a second sensor signal from the sensor upon a change of the first mass flow rate to a second mass flow rate; and

update, based on the second sensor signal, the measurement output at an update rate that is at least five percent of an oscillation frequency of the conduit.

39. (Previously Presented) The flowmeter of claim 38 wherein the measurement output includes a pulse output of the flowmeter.

40. (Previously Presented) The flowmeter of claim 38 wherein the measurement output includes a 4-20mA output of the flowmeter.

41. (Previously Presented) The flowmeter of claim 38 wherein the property of the fluid includes a mass flow rate of the fluid.

42. (Previously Presented) The flowmeter of claim 38 wherein the property of the fluid includes a density of the fluid.

43. (Previously Presented) The flowmeter of claim 38 wherein the update rate is at least ten percent of the oscillation frequency of the conduit.

44. (Previously Presented) The flowmeter of claim 38 wherein the update rate is at least twenty percent of the oscillation frequency of the conduit.

45. (Previously Presented) The flowmeter of claim 38 wherein the update rate is at least fifty percent of the oscillation frequency of the conduit.

46. (Previously Presented) The flowmeter of claim 38 wherein the update rate is greater than or equal to the oscillation frequency of the conduit.

47. (Previously Presented) A controller for a flowmeter comprising:

an input module operable to receive a sensor signal from a sensor connected to a flowtube oscillating at an oscillation frequency, the sensor signal related to a flow of a fluid through the flowtube;

a signal processing system operable to receive the sensor signal, determine sensor signal characteristics using digital signal processing, and output a measurement output characterizing a property of the fluid flow; and

a control system operable to modify the measurement output in response to a change in condition of the fluid flow, to thereby obtain a modified measurement output, wherein a response time between the change in condition of the fluid flow and an outputting of the modified measurement output is less than 100 ms.

48. (Previously Presented) The controller of claim 47 wherein the update rate is less than 50 ms.

49. (Previously Presented) The controller of claim 47 wherein the update rate is less than 30 ms.

50. (Previously Presented) The flowmeter of claim 47 wherein the measurement output includes a pulse output of the flowmeter.

51. (Previously Presented) The flowmeter of claim 47 wherein the measurement output includes a 4-20mA output of the flowmeter.

52. (Previously Presented) The flowmeter of claim 47 wherein the property of the fluid includes a mass flow rate of the fluid.

53. (Previously Presented) The flowmeter of claim 47 wherein the property of the fluid includes a density of the fluid.

54. (New) The controller of claim 11 wherein a volumetric fraction of the fluid flow comprising introduced gas is 5% or more.

55. (New) The controller of claim 14 wherein the control system is operable to increase the drive gain by a factor of ten times.

56. (New) The controller of claim 14 wherein the control system is operable to increase the drive gain by a factor of twenty times.

57. (New) The method of claim 18 wherein a volumetric fraction of the aerated fluid flow comprising gas is 5% or more.

58. (New) A controller for a flowmeter comprising:

an input module operable to receive a sensor signal from a sensor connected to a vibratable flowtube, the sensor signal related to a fluid flow through the flowtube;

a signal processing system operable to receive the sensor signal, determine sensor signal characteristics, and output drive signal characteristics for a drive signal applied to the flowtube;

an output module operable to output the drive signal to the flowtube; and

a control system operable to modify the drive signal and thereby maintain oscillation of the flowtube during a transition of the flowtube from a substantially empty state to a substantially full state.

59. (New) The controller of claim 58 wherein the control system is further operable to modify the drive signal and thereby maintain oscillation of the flowtube during a transition of the flowtube from a substantially full state to a substantially empty state.

60. (New) The controller of claim 58 wherein the control system is further operable to modify the drive signal and thereby maintain oscillation of the flowtube while separate batches of the fluid flow are processed through the flowtube, wherein the flowtube is substantially empty in between the separate batches.

61. (New) A method for operating a flowmeter comprising:

maintaining oscillation of a flowtube associated with the flowmeter during a substantially empty state of the flowtube;

maintaining oscillation of the flowtube during an onset of fluid flow through the flowtube; and

determining, based on sensor signals from a sensor connected to the flowtube, a property of the fluid flow.

62. (New) The method of claim 61 comprising:

processing the sensor signal to determine sensor signal characteristics;

determining, based on the sensor signal characteristics, drive signal characteristics for a drive signal applied to the flowtube, the drive signal characteristics including a drive gain; and

adjusting the drive gain to maintain oscillation of the flowtube in response to an extent to which the flowtube is filled by the fluid flow.

63. (New) The method of claim 61 comprising maintaining oscillation of the flowtube while separate batches of the fluid flow are processed through the flowtube, wherein the flowtube is substantially empty in between the separate batches.

64. (New) The method of claim 61 wherein maintaining oscillation of the flowtube during an onset of fluid flow through the flowtube comprises maintaining oscillation of the flowtube when the flowtube is substantially filled by the fluid flow.